GPM Ground Validation UND Citation Navigation Data GCPEx

Introduction

The Cessna Citation II Research aircraft, owned and operated by the University of North Dakota (UND), participated in the GPM Cold-season Precipitation Experiment (GCPEx) by serving as an in situ microphysics sampling platform. The GCPEx navigation data set, which was collected in Ontario, consists of final processed files containing records that include flight time, aircraft location (latitude, longitude, altitude), air temperature, wind speed, and other relevant parameters.

Campaign

The GPM Cold-season Precipitation Experiment (GCPEx) occurred in Ontario, Canada during the winter season of 2011-2012. GCPEx addressed shortcomings in the GPM snowfall retrieval algorithm by collecting microphysical properties, associated remote sensing observations, and coordinated model simulations of precipitating snow. These data sets were collected to aid in the achievement of the over arching goal of GCPEx which is to characterize the ability of multi-frequency active and passive microwave sensors to detect and estimate falling snow.

For GCPEx, the UND Citation flew in close coordination with NASA's DC-8. The UND Citation data served as a reference microphysics data set for assessing the scattering of snow and ice viewed within the swath of the DC-8's instruments.

Further details on GCPEx are available at https://ghrc.nsstc.nasa.gov/home/field-campaigns/gcpex. Information on the Global Precipitation Measurement (GPM) mission is available at http://pmm.nasa.gov/GPM.

Instrument Description

The Cessna Citation II Research Aircraft is owned and operated by the University of North Dakota (UND). The Citation II is a twin-engine fanjet with an operating ceiling of 43,000 feet (13.1 km). The turbofan engines provide sufficient power to cruise at speeds of up to 340 knots (175 m/s) or climb at 3300 feet per minute (16.8 m/s). These high performance capabilities are accompanied by relatively low fuel consumption at all altitudes which gives the Citation an on-station time of 3-5 hours depending on the mission type. Long wings allow the Citation to be operated out of relatively short airstrips and to be flown at lower speeds (140 kts or 72 m/s) necessary for many types of measurements. The Citation is certified for flight into known icing conditions. Further details on the UND Cessna Citation II are available at http://cumulus.atmos.und.edu/.

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File Naming Convention

The UND Citation Navigation data files are ASCII text files and are named with the following convention:

nav_[YYYY]_[MM]_[DD]_[HH]_[MM]_[SS].gcpex

where,

nav = navigation file
YYYY = year
MM = month
DD = day
HH = hours
MM = minutes
SS = seconds
gcpex = GPM Cold-season Precipitation Experiment (GCPEx)

A PDF document is also included in the data files and is named with the following convention:

GCPEx_Flight-Time_Details-cit.pdf

The PDF document outlines the flight date, flight start and stop times, and the type of precipitation event observed.

Data Format

The GPM Ground Validation UND Citation Navigation Data GCPEx data set consists of ASCII (.txt) files. The .txt files from UND contain a header followed by rows of data. Additional details on the data format of the files can be found at http://airborneresearch.atmos.und.edu/dataformat.aspx.

Citation

Our data sets are provided through the NASA Earth Science Data and Information System (ESDIS) Project and the Global Hydrology Resource Center (GHRC) Distributed Active Archive Center (DAAC). GHRC DAAC is one of NASA's Earth Observing System Data and Information System (EOSDIS) data centers that are part of the ESDIS project. ESDIS data are not copyrighted; however, in the event that you publish our data or results derived by using our data, we request that you include an acknowledgment within the text of the article and a citation on your reference list. Examples for general acknowledgments, data set citation in a reference listing, and crediting online web images and information can be found at: https://ghrc.nsstc.nasa.gov/home/about-ghrc/citing-ghrc-daac-data

References

Delene, D. J., Aircraft Data Processing and Analysis Software Package, Earth Science Informatics, 1-16, 2010, DOI URL:http://dx.doi.org/10.1007/s12145-010-0061-4, DOI: 10.1007/s12145-010-0061-4.

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